Bottom Line
Pediatric patients presenting in the ED with head trauma can be identified as low risk by 6 prediction factors and managed safely without a Head CT:

Age<2 years & NONE of the following factors: AMS, palpable skull fracture, scalp hematoma (except frontal), hx of LOC ≥ 5s, severe MOI, or not acting normally per parent

OR

Age≥2 years & NONE of the following factors: AMS, signs of basilar skull fracture, Hx of LOC, history of vomiting, severe MOI or severe headache

Why is this important for EM
Head trauma in patients (<18 years) accounts for 600,000 ED visits yearly. The majority of children (40-60%) getting scanned have only minor head trauma (GCS 14-15) and less than 10% of those head CTs show traumatic brain injuries. Getting CT scans for pediatric patients is not benign. The estimated rate of lethal malignancy for pediatric cranial CT is 1/5000. Accurately identifying low risk patients can help prevent unnecessary radiation exposure.

The study derives and validates a prediction rule using 6 clinical variables to identify patients as low risk for clinically important traumatic brain injury (cITBI).

Major Points
In the Age<2 group, only 1 out of 4528 patients in the derivation group & 0 out of 1176 in the validation group had an adverse outcome (Sensitivities of 98.6% & 100% and NPV of 99.9% & 100% respectively) using the prediction rule.

In the Age≥2 group, only 7 out of 14656 patients in the derivation group & 2 out of 3798 in the validation group had an adverse outcome (Sensitivities of 96.7% & 96.8% and NPV of 99.95% & 99.95% respectively) using the prediction rule.

Design & Results
Prospective cohort study using data collected at 25 EDs of the Pediatric Emergency Care Applied Research Network (PECARN). Children presenting within 24 hrs of head trauma. Excluded patients with trivial MOI or no significant signs of head trauma.

57030 eligible patients. 42,412 patients with GCS 14-15 eligible for analysis. 14969 CT scans were obtained from the enrolled patients and evaluated with prediction rules. Trained site investigators and other ED physicians recorded patient history, injury mechanism, and symptoms and signs on a standardised data form before knowing imaging results (if imaging was done). Data studied for the derivation population from Jun 2004 - Mar 2006 and the validation population from March-Sept 2006. Patients were <18 years of age.

Criticism
Not every child enrolled in the study received a CT Scan. No assessment of long-term neurologic status.